

Pub

JUL 19 1996

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Dale E. Dawkins, Director
Vehicle Compliance & Safety Affairs
Chrysler Corporation - CIMS 482-00-91
800 Chrysler Drive East
Auburn Hills, MI 48326-2757

NSA-111paw
96V-099

Dear Mr. Dawkins:

This acknowledges receipt of your Defect Information Report submitted June 7, 1996, filed in accordance with 49 CFR Part 573, "Defect and Noncompliance Reports." This recall involves 321,000 Chrysler Corporation (Chrysler) 1991 through 1993 Dodge Caravan, Grand Caravan, Plymouth Voyager, Grand Voyager, and Chrysler Town and Country model vehicles manufactured from July 1990 through June 1993; 1990 through 1993 Dodge Dynasty, Chrysler New Yorker, and Imperial model vehicles manufactured July 1989 through June 1993; and 1991 through 1992 Dodge Monaco and Eagle Premier model vehicles manufactured from July 1990 through June 1992. All of these vehicles are equipped with an antilock braking system (ABS). The ABS hydraulic control unit can experience excessive brake actuator piston seal wear which can cause pump-motor deterioration. If this occurs, the ABS function could be lost and reduced power assist may be experienced during vehicle braking. The assigned ID Number for this recall campaign is 96V-099 (Chrysler Campaign No. 685).

Chrysler is responsible for the remedy of these vehicles from this date forward, regardless of vehicle age, mileage, or ownership. You should know that the agency provides a listing of safety recalls to the media at the end of each month. This recall will be a part of that listing.

This recall was the subject of a Preliminary Evaluation, PE94-024, and Engineering Analyses, EA94-028 and EA95-016, conducted by the Office of Defects Investigation.

ADDITIONAL INFORMATION REQUIRED

In order for us to complete our file on this matter, under Part 573.5(c)(8), we request that Chrysler identify and describe how the remedial program will be conducted. This description should identify where repairs are to be made and how notification to

purchasers will be conducted. It is otherwise assumed that this recall shall begin nationally, and uniformly, within 30 calendar days. We request that Chrysler provide a proposed schedule for the implementation of this recall. The schedule should include, but not be limited to, the dates of (1) notification to distributors, dealers/retailers, and purchasers; (2) the news release to the media as well as a hard copy or transcript; and (3) when parts necessary for remedy of this recall will be available. The schedule must also include an explanation for any delay in the implementation of this recall.

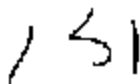
Please provide this information, referencing the National Highway Traffic Safety Administration's identification codes on page 1 of this letter, to this office by August 14, 1996.

QUARTERLY STATUS REPORTS

As stated in Part 573.6, submission of the first of six consecutive quarterly status reports is required within 1 month after the close of the calendar quarter in which notification to purchasers occurs. For instance, the current calendar quarter began on July 1 and ends on September 30, 1996. If notification begins during this time period, the first quarterly report is due by October 30, 1996. In the case where the recall appears to be completed, quarterly reporting is required until your company is notified otherwise by this office.

If you have any questions or there is a delay in the mailing, please contact Mrs. Pat Wallace or Mrs. Barbara Hayes at (202) 366-5232 or fax at (202) 366-7882.

Sincerely,



Jonathan D. White, Chief
Recall Analysis Division
Office of Defects Investigation
Safety Assurance



Dale E. Dawkins
Director
Vehicle Compliance & Safety Affairs

April 19, 1996

96V-099 (01)

Mr. Michael B. Brownlee
Associate Administrator, Safety Assurance
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Mr. Brownlee:

In accordance with the provisions of the National Traffic and Motor Vehicle Safety Act of 1966 and 49 CFR Part 573, Chrysler Corporation herewith furnishes the details of a recall regarding a potential safety related problem in some 1990 through 1993 model year vehicles. The potential for the antilock brake system (ABS) to malfunction exists in a small percentage of these vehicles.

This condition is the subject of NHTSA inquiries PE94-024, EA94-02B and EA95-01B, which, as was previously discussed between our offices, are resolved by the herein described voluntary recall action on the part of Chrysler.

At the time of recall launch, representative copies of communications to dealers and customers will be provided. Vehicle Identification Number range and assembly plant information for the involved vehicles will also be furnished at that time.

Sincerely,

Dale E. Dawkins

Enclosures: Information Report for Chrysler Recall #685

cc: K.C. DeMeter, NHTSA

INFORMATION REPORT FOR CHRYSLER RECALL #685

96V-059 (92)

Submission date: April 19, 1996
Identifying classification of vehicles potentially affected:

<u>Make</u>	<u>Model</u>	<u>Model Year</u>	<u>Inclusive Dates of Manufacture</u>	<u>Volume</u>	<u>Other</u>
Dodge	Caravan	1991 through 1993	July, 1990 through June, 1993	254,000 (est.)	Vehicles equipped with ABS
Plymouth	Voyager				
	Grand Voyager				
Chrysler	Town & Country				
Dodge	Dynasty	1990 through 1993	July, 1989 through June, 1993	64,000 (est.)	Vehicles equipped with ABS
Chrysler	New Yorker				
	Imperial				
Dodge	Monaco	1991 through 1992	July, 1990 through June, 1992	3,000 (est.)	Vehicles equipped with ABS
Eagle	Premier				

Estimated percentage in which problem may occur:

Less than 10% of the vehicles not yet repaired.

Description of problem:

The antilock brake system (ABS) hydraulic control unit may experience excessive brake actuator piston seal wear which may cause pump-motor deterioration. If this occurs, the ABS function may be lost and reduced power assist may be experienced during vehicle braking. The instrument panel warning lights will signal system impairment and the base manual brakes will remain functional.

The name, address and telephone number of the supplier who manufactured the subject component:

Allied Signal Automotive
 20650 Civic Center Drive
 P.O. Box 5060
 Southfield, MI 48088
 Phone no.: (810) 827-5536

INFORMATION REPORT FOR CHRYSLER RECALL #685

April 19, 1996

Page 2

96V-099 (03)

Chronological summary of events which were the basis for determining existence of problem:

The following events occurred in the period from March, 1994 through mid-April, 1996.

- NHTSA opened a preliminary investigation (PE94-024) for Chrysler minivans equipped with Bendix 10 ABS.
- Chrysler responded to the preliminary investigation.
- NHTSA upgraded the investigation to an engineering analysis (EA94-028).
- NHTSA opened another engineering analysis (EA95-016) for Chrysler passenger cars equipped with Bendix 10 ABS.
- Chrysler responded to the engineering analyses.
- Investigation determined that, in some cases, the ABS hydraulic control unit (HCU) may fail to adequately pressurize the brake system due to internal leakage past a prematurely worn brake actuator piston seal. An inadequately pressurized brake system may result in pump-motor deterioration or failure due to extended operation.
- An analysis of improved ABS diagnostic procedures and potential field fix was initiated.
- Investigation determined that the affected population includes all vehicles produced with the subject ABS model (Bendix 10) system.
- Chrysler has reports of 60 accidents and 18 minor injuries related to the subject condition.

Statement of measures to be taken and estimated notification schedule:

Chrysler will take the actions listed below for all affected vehicles:

- Inform owners of the potential for excessive ABS HCU brake actuator piston seal wear and possible pump-motor deterioration. Owners of vehicles that experience illumination of brake warning lamps or that sense any ABS malfunction should contact their dealers immediately to have their vehicle's ABS tested and repaired as necessary.
- The warranty on all ABS components will be extended to 10 years or 100,000 miles (except for the brake actuator piston assembly and the pump-motor assembly which will have lifetime coverage).
- Owners will be reimbursed for previous ABS component repair costs.

Chrysler's notification schedule for implementing this recall has not been finalized. We are currently arranging for enhanced dealer diagnostic test equipment and for a supply of necessary replacement parts and preparing the information required for implementation. Chrysler expects to begin parts distribution and national notification to both dealers and owners when a sufficient quantity of parts become available. Further, a follow up notification will be conducted about two years after initial notification.

RECEIVED



Dale E Dawkins
Director
Vehicle Compliance & Safety Affairs

JUN 18 1996
OFFICE
DEFECTS INVESTIGATION

June 18, 1996

Mr. Michael B. Brownlee, Associate Administrator, Safety Assurance
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Mr. Brownlee:

Reference: NHTSA Identification Number 96V-099

Enclosed is a representative copy of the communication which explains the extended warranty related to the referenced recall. This continues Chrysler's package of information for this recall as required by the Defects Report Regulation.

Sincerely,

Dale E. Dawkins

Enclosures: Warranty Bulletin D-96-19 -- Warranty Coverage Extension on Bendix
10 ABS Components

cc: K. C. DeMeter

NO. D-96-19
DATE June 1996

**Subject: WARRANTY COVERAGE EXTENSION
ON BENDIX 10 ABS COMPONENTS**

FOR: C/P/D dealer
 J/E dealer
 all dealers
 zone office
 field

This bulletin is issued to clarify dealer inquiries regarding the warranty coverage on certain ABS brake components.

Effective immediately, the warranty on Bendix 10 ABS components is extended to 10 years or 100,000 miles, whichever comes first. The ABS brake piston seal and pump motor assembly are extended to lifetime as per Recall #685. This extension applies to the vehicle regardless of ownership.

Bendix 10 ABS was used on 1990-1993 Chrysler New Yorker, Salon, Fifth Avenue, Imperial and Dodge Dynasty. 1991-1993 Chrysler Town & Country, Dodge Caravan / Grand Caravan and Plymouth Voyager / Grand Voyager. 1991-1992 Dodge Monaco and Eagle Premier.

NOTE: 1990 vehicles built through March 26, 1990 (MDH 03-26-XX) are equipped with a Bosch ABS brake system, and therefore are not included in the recall or the extended warranty.

The covered Labor Operations (LOP), LOP description and warranty coverage are as follows:

Labor Operation	Description	Coverage
05-25-25-01	Pressure/Return Hose Assembly, replace	10/100
05-30-17-02	Proportioning Valve w/switch, replace	10/100
05-40-07-02	Hydraulic Assembly, test & replace	Lifetime
05-40-07-93	Piston Assembly Actuator, replace (TSB 05-13-92 & 05-24-94)	Lifetime
05-40-25-02	Master Cylinder Reservoir, replace	10/100
05-45-04-01	Pump Supply Filter, replace	10/100
05-45-04-90	Pump Supply Filter, replace (TSB 05-24-94)	10/100
05-60-02-02	Pump/Motor Assembly, replace	Lifetime
05-60-03-01	Accumulator Assembly, replace	10/100
05-65-01-01	Primary Pressure Transducer, replace	10/100
05-45-03-90	Primary Pressure Transducer, replace (TSB 05-24-94)	10/100
05-65-02-01	Boost Pressure Transducer, replace	10/100
05-45-03-91	Boost Pressure Transducer, replace (TSB 05-24-94)	10/100

Reviewed by Service Manager Parts Manager Office Manager Other Page 1 of 2

05-67-01-01	Differential Pressure Switch, replace	10/100
05-45-02-90	Differential Pressure Switch, replace (TSB 05-24-94)	10/100
08-14-18-02	Right Front Wheel Speed Sensor, replace	10/100
08-14-18-03	Left Front Wheel Speed Sensor, replace	10/100
08-14-18-04	Right Rear Wheel Speed Sensor, replace	10/100
08-14-18-05	Left Rear Wheel Speed Sensor, replace	10/100
08-14-18-94	All Four Wheel Speed Sensors , inspect (TSB 05-10-93 Rev A)	10/100
08-14-18-95	One or Both Front Wheel Speed Sensors, replace (TSB 05-10-93 Rev A)	10/100
08-14-18-96	One or Both Rear Wheel Speed Sensors, replace (TSB 05-10-93 Rev A)	10/100
08-65-56-01	Pump/Motor Relay, replace	10/100
08-19-10-01	Controller Antilock Brake, replace	10/100
08-65-57-02	System Relay, replace	10/100
08-65-57-03	Warning Lamp Relay, replace	10/100
08-65-57-04	System/Warning Lamp Relay, replace	10/100
08-80-14-01	Dual Function Switch, replace	10/100
05-30-17-90	Dual Function Switch, replace (TSB 05-07-91)	10/100
08-90-70-01	Wiring Harness, replace	10/100
08-65-57-90	Wiring Jumper Harness Assembly (TSB 05-05-92)	10/100
05-50-01-91	Brake Pedal Return Spring Kit (TSB 05-08-92 Rev A)	10/100

This warranty extension also covers DRB III and MDS diagnosis if required.

Parts / repairs not listed above are excluded from this warranty extension. For example, basic brake system components such as calipers, brake pads, ... are excluded.

Before proceeding with repairs, technicians should review the recently released Service and Diagnostic Procedures Manual for Bendix Antilock 9 and 10 (Publication #81-699-96086). The new test fixture (Miller #6997) should be used to test and repair the Bendix system.

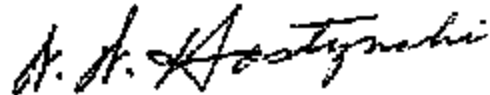
Customer notification of the Recall and Warranty extension will begin when an adequate supply of replacement parts are available.

Owners who have previously paid for a repair involving the covered parts described above within the extended warranty time period, are eligible for reimbursement consideration. To request reimbursement, owner's should send their original receipts, keeping a copy for their records to:

Chrysler Customer Center
P.O. Box 21-8004
Auburn Hills, MI 48321-8004
ATTENTION: Recall #685 Reimbursement

Should customers require further assistance regarding this issue, they should be directed to call 1-800-853-1403.

Please insure all dealership personnel are updated on this coverage extension.



W. W. Hostynski
Manager,
Warranty Administration

DLR5-306

Q & A

- Q: My vehicle was not repaired at a Chrysler Corporation dealership. Am I entitled to reimbursement consideration?
- A: Yes. If the repair was completed within the time and mileage limitations and involved Bendix 10 ABS components, a request should be submitted to Chrysler.
- Q: The pump motor assembly as well as the right front wheel speed sensor had to be replaced on my vehicle. Will the right front wheel speed sensor be included in any reimbursement consideration?
- A: Yes. All Bendix 10 ABS brake components that required replacement or repair will be included in any reimbursement consideration.
- Q: I was given a partial goodwill reimbursement by the District Manager for the ABS brake repair on my vehicle. Will consideration now be given for reimbursement of the complete repair?
- A: Yes. The portion of the ABS repair that was paid by the customer and not previously reimbursed will be considered.
- Q: I have since sold my vehicle but still have the bill for the ABS brake repairs. Am I still eligible for reimbursement?
- A: Yes. As long as an original, legible, paid receipt is submitted reimbursement will be considered.
- Q: I have lost my receipt. Can I still get a reimbursement?
- A: Yes. As long as documentation can be furnished for consideration. The repairing facility should be contacted to see if a duplicate paid receipt can be obtained. Canceled checks or credit card receipts should be submitted as further supporting documentation.
- Q: The calipers on my vehicle had to be replaced. Is this replacement eligible for reimbursement?
- A: No. Basic Brake system components such as calipers, brake pads or shoes and linings are not included.

WARRANTY BULLETIN INDEX

<u>BULLETIN #</u>	<u>DATE</u>	<u>SUBJECT</u>
D-96-18	6/96	Addition of Cummins Injector Pumps to Parts Authorization Program
D-96-19	6/96	Warranty Coverage Extension on Bendix 10 ABS Components

Dale E. Dawkins

August 27, 1996

August 27, 1996

Mr. Michael B. Brownlee, Associate Administrator, Safety Assurance
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Mr. Brownlee:

Reference: NHTSA Identification Number 96V-099

Enclosed are representative copies of communications relating to the referenced recall. In order to facilitate implementation, this recall has been divided into two phases based on vehicle model. Owner notification for the first phase of the recall will begin in about one week. The number of manufactured vehicles in this phase of the recall is 66,640, broken down as follows:

Make	Model	Volume
Dodge	Dynasty	15,405
	Monaco	253
Chrysler	New Yorker/Salon	3,980
	Fifth Avenue	15,889
	Imperial	27,978
Eagle	Premier	3,135

The involved Vehicle Identification Number range for this phase of the recall is:


Model Year	Low	High
1990	LD741231	LD915361
1991	MD100001	MD298810
	MH800003	MH817062
1992	ND700002	ND863046
	NH100007	NH107173
1993	PD100002	PD225808

(VIN last eight characters) - L = 1990 Model Year; M = 1991 Model Year; N = 1992 Model Year; P = 1993 Model Year; D = Belvidere Assembly Plant, Belvidere, Illinois; H = Bramalea Assembly Plant, Bramalea, Ontario; and last six digits = sequential number.

We caution that the above range represents only the lowest and highest VIN sequential numbers included in this part of the recall. This range cannot be used to determine conclusively that a vehicle is involved in the recall because many vehicles with a VIN within the range are not affected by the recall.

Vehicle volume and VIN range information for vehicles involved in the second phase of the recall will be provided prior to owner notification in about one month. This continues Chrysler's package of information for this recall as required by the Defects Report Regulation.

Sincerely,



Dale E. Dawkins

Enclosure: Recall #685

cc: K. C. DeMeter

IMPORTANT

DEALER SERVICE INSTRUCTIONS

Safety Recall #685 -- ABS Actuator Piston and Pump/Motor Assemblies

- This service requirement applies only to the vehicles listed below equipped with a Bendix-10 Antilock Brake System:
 - 1991 Through 1993 Model Year Dodge Caravan/Grand Caravan; Plymouth Voyager/Grand Voyager; and Chrysler Town & Country (AS)
 - Late-1990 Through 1993 Model Year Dodge Dynasty; Chrysler New Yorker, Salon (AC), Fifth Avenue and Imperial (AY)
 - 1991 and 1992 Model Year Eagle Premier and Dodge Monaco (BB)
- Owners of involved vehicles will be instructed to make an appointment with their dealer only if specific symptoms occur. (See owner letter for details.)
- A small number of the involved vehicles may experience ABS hydraulic control unit actuator piston seal wear and/or hydraulic pump/motor deterioration. To correct this condition, the ABS system must be tested and the actuator pistons and/or pump/motor replaced if necessary.
- This recall will be launched in stages. Owners of AC, AY and BB passenger cars will be notified initially.
- Effective immediately all actuator piston assembly replacements on involved vehicles are to be performed according to this Recall Notification. The related Labor Operation Numbers from TSB's 05-13-92 and 05-24-94 are being canceled.

10 Year/100,000 Mile Bendix-10 ABS Component Warranty:

- Vehicles involved in this recall also have a 10 year or 100,000 mile warranty on Bendix-10 ABS components (the actuator piston and pump/motor have lifetime coverage). If any conditions covered by the ABS warranty are found, now or in the future, dealers are to correct these conditions free of charge. Refer to Warranty Bulletin D-96-19 issued June, 1996 for specific details of coverage. Parts for any of the covered components should be ordered through the normal means.

Alternate Transportation:

- Dealers who are servicing a vehicle that requires actuator piston and/or pump/motor replacement should attempt to minimize customer inconvenience. Contact your zone office for further instructions on alternate transportation authorization if necessary.

Parts Packages:

- Due to the small number of vehicles expected to require repair, no parts will be distributed initially to dealers. Dealers are requested to order Actuator Piston Assembly packages through normal methods for scheduled repairs only. Dealers must contact the STAR Center (1-800-850-STAR Ext. 5) to order Pump/Motor Assemblies. The technician must perform the ABS diagnostic tests prior to contacting the STAR Center and have the results available for review.

No. 685
August, 1996

- To:** All Dodge, Chrysler-Plymouth and Jeep®/Eagle Dealers
- Subject:** Safety Recall #685 – ABS Actuator Piston and Pump/Motor Assemblies
- Models:** Vehicles Listed Below Equipped With a Bendix-10 Antilock Brake System:
- 1991 Through 1993 Model Year Dodge Caravan/Grand Caravan; Plymouth Voyager/Grand Voyager; and Chrysler Town & Country (AS)
 - Late-1990 Through 1993 Model Year Dodge Dynasty; Chrysler New Yorker, Salon (AC), Fifth Avenue and Imperial (AY)
 - 1991 and 1992 Model Year Eagle Premier and Dodge Monaco (BB)

Note: 1990 vehicles built through March 26, 1990 (MDH 0326XX) are equipped with a Bosch antilock brake system, and therefore, are not included in this recall or the extended warranty.

A small number of the involved vehicles may experience ABS hydraulic control unit actuator piston seal wear and/or hydraulic pump/motor deterioration. To correct this condition, the ABS system must be tested and the actuator pistons and/or pump/motor replaced if necessary. If testing determines other ABS components are faulty, repairs are to be performed using the revised service and diagnostic procedures manual (81-899-86086) and existing parts. Submit a separate warranty claim using the existing labor operation numbers.

IMPORTANT: Some of the involved vehicles may be in dealer used vehicle inventory. Be sure to complete this recall service on these vehicles before retail delivery. Dealers should perform this recall on vehicles in for service as determined by using DIAL System Function 70 or VIP.

Details of this service action are explained in the following sections.

Service Procedure Videotape

No videotape of the service procedure for this recall will be provided.

Dealer Notification & Vehicle List

Involved dealers: Each dealer to whom involved vehicles were invoiced (or the current dealer at the same street address) will receive a copy of this dealer recall notification letter and a list of the involved vehicles by first class mail.

The Vehicle List is arranged in Vehicle Identification Number (VIN) sequence. Owners known to Chrysler are also listed. The lists are for dealer reference in arranging for service of involved vehicles.

Dealer Notification & Vehicle List (Continued)

All other dealers: Each Dodge, Chrysler-Plymouth and Jeep/Eagle dealer who does not receive a Vehicle List will receive a copy of this dealer recall notification letter by first class mail.

DIAL System Functions 53, 70 and VIP

All involved vehicles will be entered to DIAL System Functions 53, 70 and VIP at the time of recall implementation for dealer inquiry by VIN as needed.

Parts

Important: Due to the small number of vehicles expected to require repair, no parts will be distributed initially to dealers. Dealers are requested to order Actuator Piston Assembly packages through normal methods only for scheduled repairs. Dealers must contact the STAR Center (1-800-850-STAR Ext. 5) to order Pump/Motor Assemblies. The technician must perform the ABS diagnostic tests prior to contacting the STAR Center and have the results available for review.

Refer to the table below for the appropriate actuator piston assembly package and/or pump/motor assembly:

Model	Vehicle	Actuator Piston Assembly Package PN	Pump/Motor Assembly PN
AS	Caravan, Grand Caravan, Voyager, Grand Voyager, Town & Country	R4740086 or 4740088	R4509292 or 4509292
AC/AY	Dynasty, New Yorker, Salon, Fifth Avenue, Imperial	R4740084 or 4740084	R4723544 or 4723544
BB	Premier, Monaco	R4856887 or 4856887	R4584472 or 4584472

Each Actuator Piston Assembly Package includes:

- 1 -- Primary Piston Assembly
- 1 -- Secondary Piston Assembly
- 1 -- Snap Ring
- 1 -- Clip, Hydraulic Assembly Push Rod (4294036)*
- 1 -- Gasket, Hydraulic Assembly Mounting (4485527)*
- 1 -- Long Handle Cleaning Aid and Lint Free Cloth

* Hydraulic assembly push rod clips and gaskets for **NON-REMANUFACTURED Actuator Piston Packages** must be ordered separately.

Owner Notification and Service Scheduling

All involved vehicle owners known to Chrysler are being notified of the service requirement by first class mail. They are requested to schedule appointments for the service with their dealers only if specific symptoms occur. A copy of the owner notification letter is attached.

Enclosed with each owner notification is an Owner Notification Form. The involved vehicle and recall are identified on the form for owner or dealer reference as needed.

Service Procedure

A. Test ABS for Proper Operation:

1. Connect the DRB Scan Tool to the Data Link Connector (DLC). Be sure to use the appropriate connecting cables for the DRB Scan Tool (II or III) that you are using. Be sure that the DRB contains the latest software and a Super Cartridge or Supercard if necessary.
2. With the DRB Scan Tool, read, record and then erase all Bendix ABS Diagnostic Trouble Codes (DTC's).

NOTE: The ignition key must be turned to the OFF position after erasing DTC's to ensure that all DTC's are properly erased inside the Controller - Antilock Brake (CAB).

3. With the ignition key in the ON position, monitor the DTC display for four minutes.
 - If any DTC's are displayed, they must be diagnosed and repaired in the order that they are listed on page 221 of the Bendix Antilock 9 & 10 Service and Diagnostic Procedures Manual (81-699-98086).
 - If no DTC's are displayed, continue with Step 4.
4. With the ignition key in the OFF position, pump the brake pedal a minimum of 40 times using about 50 lbs (222 N) of pedal force. A noticeable change in the pedal feel will occur when the accumulators are discharged.

WARNING: Brake system is under extreme pressure. The Hydraulic Control Unit (HCU) may be charged with hydraulic pressure up to 2200 psi. Failure to de-pressurize the accumulators could result in personal injury and/or damage to painted surfaces. Wear safety goggles when disconnecting system fluid lines.

5. When a definite increase in pedal pressure is felt, pump the pedal a few additional times to ensure removal of all hydraulic pressure from the brake system.

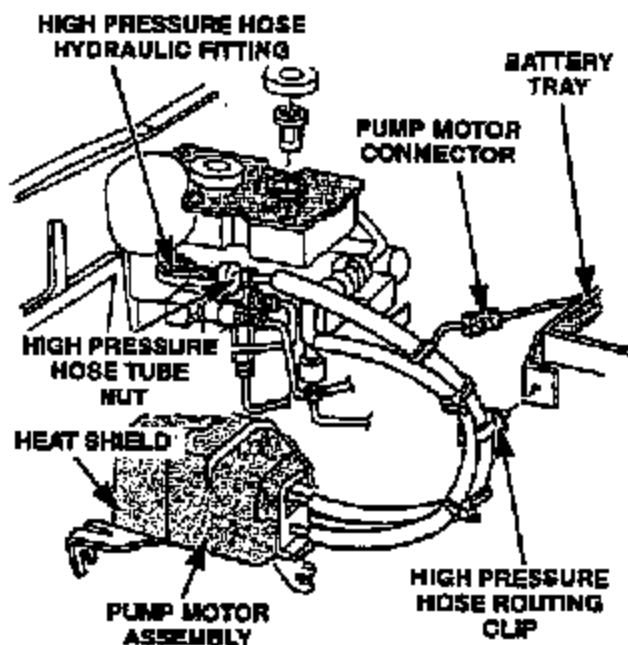
Service Procedure (Continued)

6. Install the ABS internal leakage test fixture (Special Tool #6997) per the following procedure:

- A. Remove the complete air cleaner assembly.
- B. Locate the high pressure brake fluid hose going from the HCU to the pump/motor (Figure 1). Remove the high pressure hose tube nut from the fitting on the HCU.

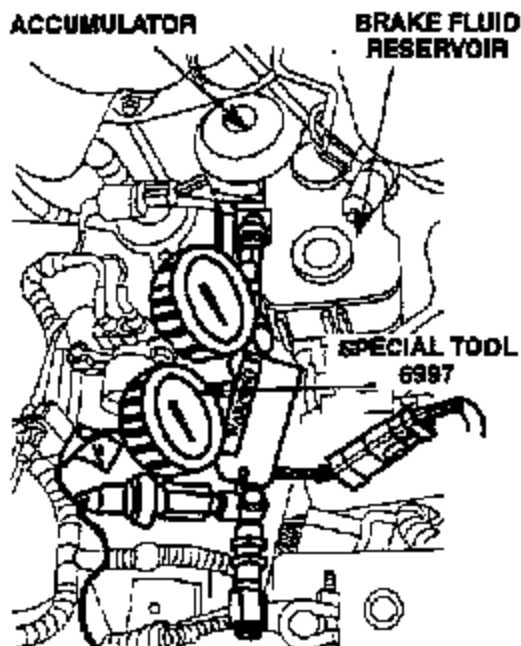
NOTE: For BB vehicles, remove the hose retainer in order to move the hoses.

- C. Install the test fixture in-line with the high pressure hose (Figures 2 & 3). Screw male end of test fixture into high pressure fitting on HCU and torque to 145 in-lbs (16 N·m).
- D. Install high pressure brake fluid hose into test fixture and torque to 145 in-lbs (16 N·m).



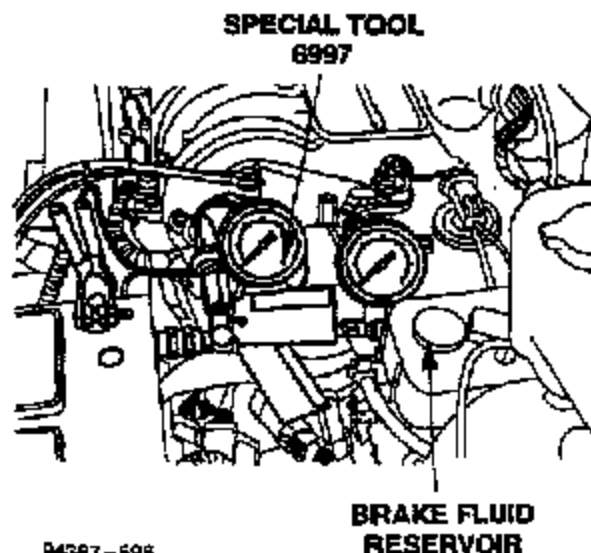
94387-847

Figure 1



94387-597

Figure 2



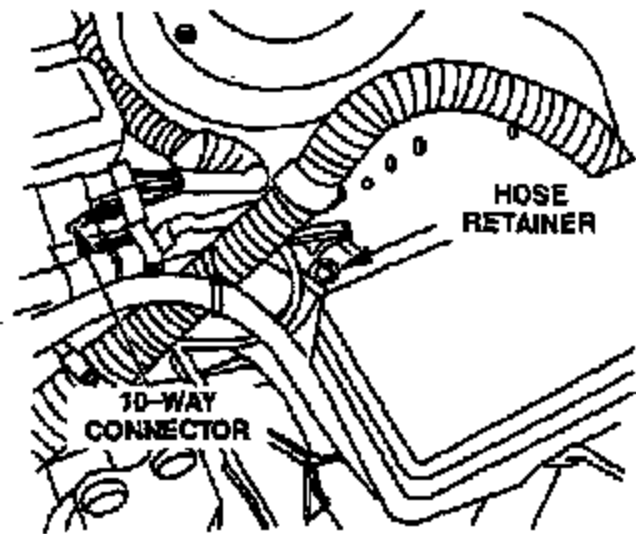
94387-596

Figure 3

Service Procedure (Continued)

- E. Disconnect the upper (black) HCU 10-way wiring harness connector (Figure 4) and connect it to the test fixture.
- F. Attach the test fixture ground clip to the negative battery terminal.

WARNING: Connection of test fixture wire harness as described in Steps E and F above, is required prior to start of test or pump/motor damage will occur.



94387-880

- 7. Open the shut-off valve on the test fixture.
- 8. Turn the ignition key to the RUN position.
- 9. Allow accumulator pressure to build to its highest steady state value or until the pump shuts off.
- 10. Close the test fixture shut off valve within 2 seconds of pump shutoff or after reaching a steady state pressure with the pump still running, then start a timer and record both pressure gauge readings.

Figure 4

- If the pump shut off and the pump/motor pressure is 1800-2200 psi, continue with STEP 11.
- If the pump did not shut off initially but did shut off after the test fixture valve was closed, continue with STEP 11.
- If the pump continues to run after the test fixture valve is closed and the steady state pressure is LESS THAN 2200 psi, inspect the low pressure hose and pump supply filter for restriction. A supply filter restriction can be determined by noting inadequate fluid flow from the supply filter when the pump/motor supply (low pressure) hose is disconnected at the pump/motor side of the pump supply filter. If no restriction is found, replace the pump/motor assembly per the instructions in Section C.

Service Procedure (Continued)

- If the pump continues to run after the test fixture valve is closed and the steady state pressure is GREATER THAN 2200 psi:

WARNING: Turn the ignition key off if pressure exceeds 2500 psi. Damage to pump/motor components will occur at pressures greater than 2500 psi.

Disconnect the 10-way connector from the test fixture.

If the pump continues to run, continue with Diagnostic Test #25 in the Bendix Antilock 9 & 10 Service and Diagnostic Procedures Manual (81-699-96086).

If the pump stops, replace the test fixture pressure switch (PN 4485632) and begin the diagnostic test again. With the ignition key in the Off position, open the test fixture shut-off valve. Pump the brake pedal a minimum of 40 times using approximately 50 lbs (222 N) of pedal force and continue with Step 8.

11. Record the pump/motor side and HCU side pressure readings 120 seconds after closing the test fixture valve and compare with the initial readings.
 - If the pressure readings on both sides dropped less than 200 psi, continue with Step 12.
 - If the HCU side reading dropped more than 200 psi, replace the master cylinder actuator piston assemblies per the instructions in Section B.
 - If the pump/motor side reading dropped more than 200 psi or if the pump restarted within the 120 seconds, replace the pump/motor assembly per the instructions in Section C.

NOTE: Both of the above repairs may be required.

12. With the ignition key in the Off position, open the test fixture shut-off valve. Pump the brake pedal a minimum of 40 times using approximately 50 lbs (222 N) of pedal force.
13. Turn the ignition key to the RUN position.
14. Allow accumulator pressure to build to its highest steady state value or until the pump shuts off.

Service Procedure (Continued)

15. Close the test fixture shut off valve within 2 seconds of pump shutoff or after reaching a steady state pressure with the pump still running, then start a timer and record both pressure gauge readings.

- If the pump shut off and the pump/motor pressure is 1800-2200 psi, continue with STEP 18.
- If the pump did not shut off initially but did shut off after the test fixture valve was closed, continue with STEP 16.
- If the pump continues to run after the test fixture valve is closed and the steady state pressure is LESS THAN 2200 psi, inspect the low pressure hose and pump supply filter for restriction. A supply filter restriction can be determined by noting inadequate fluid flow from the supply filter when the pump/motor supply (low pressure) hose is disconnected at the pump/motor side of the pump supply filter. If no restriction is found, replace the pump/motor assembly per the instructions in Section C.
- If the pump continues to run after the test fixture valve is closed and the steady state pressure is GREATER THAN 2200 psi:

WARNING: Turn the ignition key off if pressure exceeds 2500 psi. Damage to pump/motor components will occur at pressures greater than 2500 psi.

Disconnect the 10-way connector from the test fixture.

If the pump continues to run, continue with Diagnostic Test #25 in the Bendix Antilock 9 & 10 Service and Diagnostic Procedures Manual (81-699-96086).

If the pump stops, replace the test fixture pressure switch (PN 4485632) and begin the diagnostic test again. With the ignition key in the Off position, open the test fixture shut-off valve. Pump the brake pedal a minimum of 40 times using approximately 50 lbs (222 N) of pedal force and continue with Step 8.

16. Record the pump/motor side and HCU side pressure readings 120 seconds after closing the test fixture valve and compare with the initial readings.

- If the pressure readings on both sides dropped less than 200 psi, continue with Step 17.
- If the HCU side reading dropped more than 200 psi, replace the master cylinder actuator piston assemblies per the instructions in Section B.
- If the pump/motor side reading dropped more than 200 psi or if the pump restarted within the 120 seconds, replace the pump/motor assembly per the instructions in Section C.

NOTE: Both of the above repairs may be required.

Service Procedure (Continued)

17. With the ignition key in the OFF position, open the test fixture valve and then pump the brake pedal a minimum of 40 times. A noticeable change in the pedal feel will occur when the accumulators are discharged.

WARNING: Brake system is under extreme pressure. The hydraulic control unit (HCU) may be charged with hydraulic pressure up to 2200 psi. Failure to de-pressurize the accumulators could result in personal injury and/or damage to painted surfaces. Wear safety goggles when disconnecting system fluid lines.

18. When a definite increase in pedal pressure is felt, pump the pedal a few additional times to ensure removal of all hydraulic pressure from the brake system.
19. Remove the ABS internal leakage test fixture (Special Tool #6997).
 - A. Disconnect 10-way wiring harness connector from the test fixture (Figure 4) and connect it to the HCU.
 - B. Remove the high pressure brake fluid hose from the test fixture.
 - C. Remove the test fixture from the high pressure adapter on the HCU.
 - D. Install the high pressure hose tube nut on the fitting on the HCU and torque to 145 in-lbs (16 N•m).
 - E. Install the complete air cleaner assembly.

NOTE: For BB vehicles, install the hose retainer.

20. Turn the ignition to the RUN position to energize the pump/motor and pressurize the hydraulic system. Check for leakage at the HCU.
21. With the ignition key in the OFF position, pump the brake pedal a minimum of 40 times. A noticeable change in the pedal feel will occur when the accumulators are discharged.

WARNING: Brake system is under extreme pressure. The hydraulic control unit (HCU) may be charged with hydraulic pressure up to 2200 psi. Failure to de-pressurize the accumulators could result in personal injury and/or damage to painted surfaces. Wear safety goggles when disconnecting system fluid lines.

22. Check the brake fluid level in the HCU reservoir and adjust as necessary.
23. No further action is necessary, return the vehicle to the customer.

Service Procedure (Continued)

B. Replace the HCU Actuator Piston Assemblies:

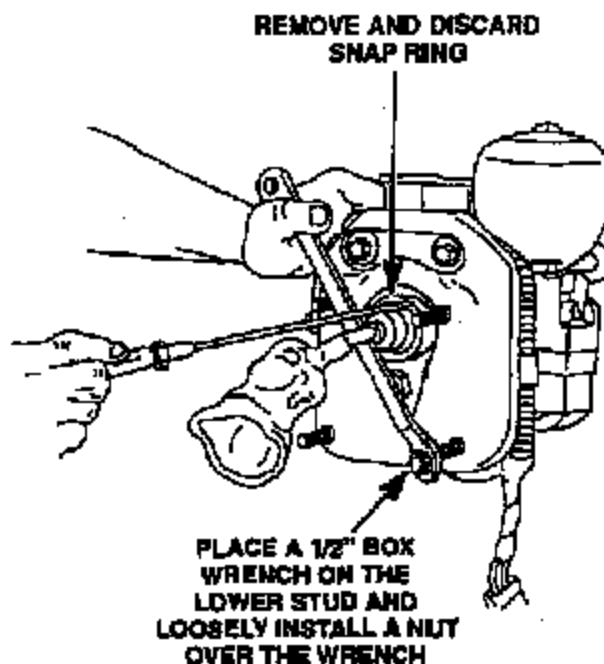
1. With the ignition key in the OFF position, open the test fixture valve and then pump the brake pedal a minimum of 40 times. A noticeable change in the pedal feel will occur when the accumulators are discharged.

WARNING: Brake system is under extreme pressure. The hydraulic control unit (HCU) may be charged with hydraulic pressure up to 2200 psi. Failure to de-pressurize the accumulators could result in personal injury and/or damage to painted surfaces. Wear safety goggles when disconnecting system fluid lines.

2. When a definite increase in pedal pressure is felt, pump the pedal a few additional times to ensure removal of all hydraulic pressure from the brake system.
3. Remove the windshield washer fluid bottle, if necessary.
4. Disconnect the two 10-way electrical connectors from the HCU and the test fixture.
5. Remove the high pressure hose fitting from the test fixture and then remove the test fixture from the HCU.
6. Disconnect the pump supply (low pressure) hose from the HCU or pump supply filter.
7. Cap all openings on brake fluid reservoir and HCU.
8. Disconnect the four brake tubes from the HCU.
9. Remove the instrument panel sight shield from below the steering column, if necessary.
10. From under the instrument panel, remove the retainer clip from the brake pedal pin. Discard the old retainer clip, a new clip must be used when the HCU is reinstalled.
11. Remove the four (4) HCU mounting nuts from the HCU studs, located under the instrument panel.
12. For AS body vehicles, disconnect the throttle position sensor (TPS) electrical connector.
13. Remove the HCU from the vehicle.

Service Procedure (Continued)

14. Remove as much brake fluid as possible from the HCU reservoir.
15. Secure the HCU by its bracket extension in a vice. Do not over tighten.
16. Remove the flange gasket from the HCU mounting bracket or the dash panel.
17. Loosen the mounting bracket from the HCU assembly enough to separate the black dust boot from the master cylinder housing, then tighten the bracket.



94387-872

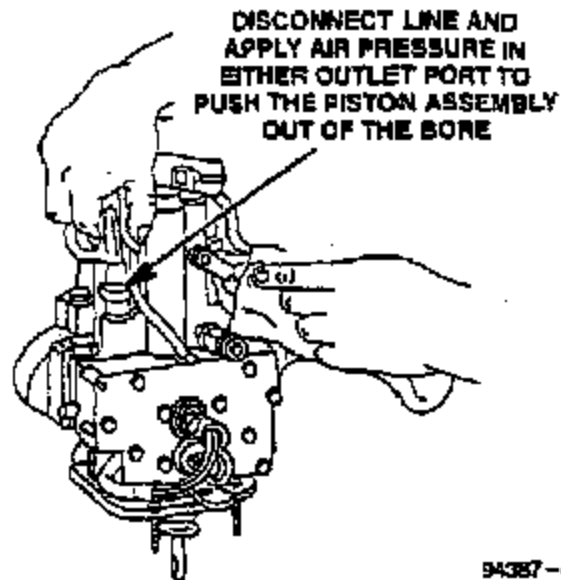
Figure 5

18. Turn the dust boot inside out and pull out of the way. Then, place a 1/2" box end wrench over a lower mounting stud (Figure 5). Place a nut on the stud and fully engage all threads. Align the wrench with the input rod bearing.
 19. Push in on the wrench against the input rod bearing, moving the bearing inward approximately 1/4" to relieve the bearing load from the snap ring.
 20. While holding the piston in, rotate the snap ring so one end is near the 12 o'clock position. Place a small screwdriver in the 12 o'clock keyway in the actuator bore (Figure 5). Pry the snap ring down and out of the groove with the screwdriver and pull the snap ring out of the end of the actuator.
- NOTE:** It may be helpful to have a screwdriver with a bent tip to remove the snap ring.
21. Slowly release the wrench from the bearing, allowing the primary piston to pop out of the actuator. Catch any fluid from the master cylinder in a suitable container.
 22. Slowly pull the primary piston assembly out of the actuator bore. Keep the assembly as straight as possible. Do not pull forcefully. If piston catches in the bore, push the piston back into the bore a short distance to align it, then try to remove it again.

NOTE: If the piston will not come out of the bore, the actuator housing must be replaced.

Service Procedure (Continued)

23. Remove the HCU from the vice and place it, stud side down, on a lint-free bench surface.
24. Place a cloth over the outlet ports of the assembly. While holding the cloth, apply compressed air pressure (regulated to about 20 psi) to the front of the actuator to remove the secondary piston assembly from the bore (Figure 6).



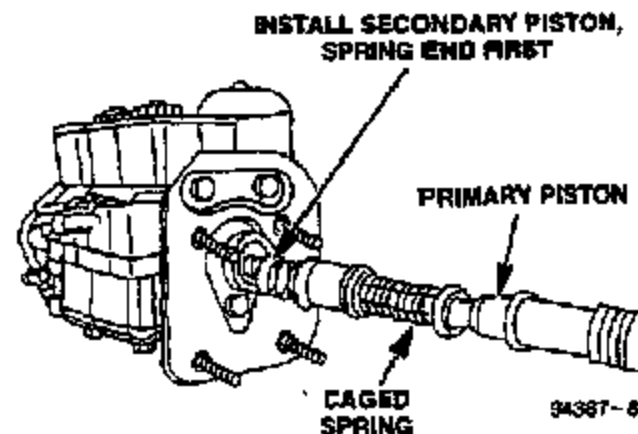
94387-873

Figure 6

25. Place the HCU back into the vice and clamp securely.
26. Using the provided long handle cleaning aid and lint-free cloth, apply clean brake fluid, which conforms to DOT 3 specifications, to the cloth and thoroughly clean the bore of the HCU. Wipe the entire circumference of the bore and work any particles toward the open end of the bore. Flush the bore, after wiping, with clean brake fluid.
27. Lubricate the cup seals, flat ring seals and O-rings of the new piston assemblies with clean brake fluid.
28. Install the secondary piston assembly, spring end first, into the actuator. Make sure that the cup seal is not folded back or twisted. Push the secondary piston in until the rear of the piston is flush with the actuator bore opening (Figure 7).

29. Position the caged spring at the end of the primary piston assembly over the pin on the rear of the secondary piston assembly (Figure 7).
30. Slowly push both piston assemblies into the actuator bore.

CAUTION: Do not cut, nick or twist any seals or the unit will not function properly.

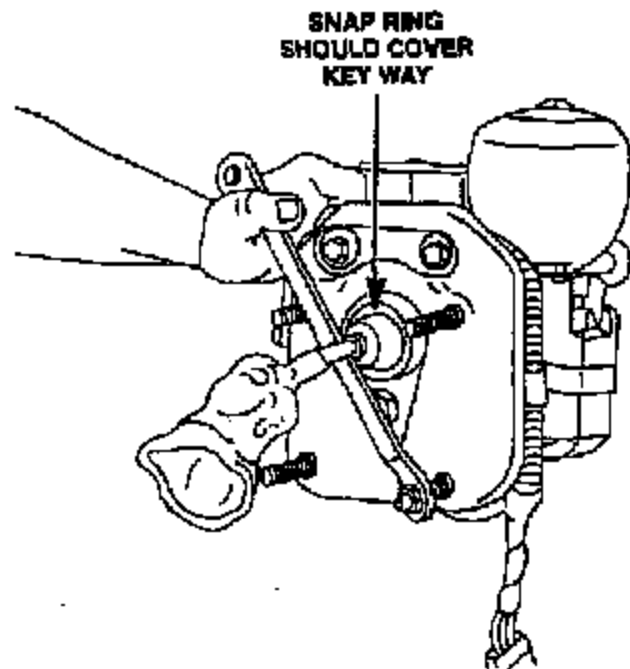


94387-874

Figure 7

Service Procedure (Continued)

31. Place the provided snap ring over the actuator push rod and bearing.
32. Push the piston assemblies all the way into the bore.
33. Place a $\frac{1}{2}$ " box end wrench over a lower mounting stud (Figure 8). Place a nut on the stud and fully engage all threads. Align the wrench with the input rod bearing.



94587-875

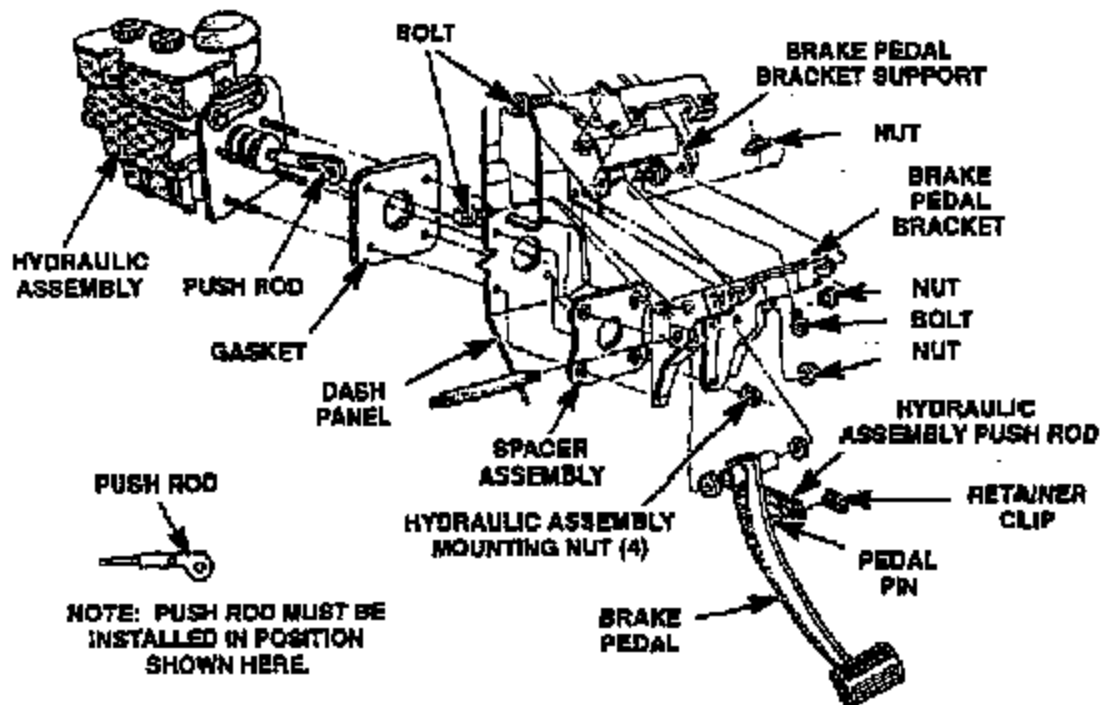
Figure 8

34. Push in on the wrench against the bearing, moving the bearing inward approximately $\frac{1}{4}$ " to compress the springs, until the shoulder of the bearing is past the snap ring groove.
35. Rotate the HCU so that the bore keyway is at the top (12 o'clock) position.
36. Position the snap ring so that one end is in the 10 o'clock position and the other end is at the 8 o'clock position. The snap ring must cover the keyway.
37. Place the 10 o'clock end of the snap ring into the snap ring groove. Then, using a flat blade screwdriver, push the snap ring into the groove, working in a clockwise direction. Make sure the entire snap ring is completely seated in the groove.
38. Slowly release the wrench, and then remove the nut and wrench from the HCU lower stud.
39. Loosen the mounting bracket from the HCU. Install the rubber dust boot over the HCU bore flange and seat the retaining ring into the groove. Tighten the mounting bracket.
40. Rotate the push rod into the position shown in Figure 9, then install the HCU in the vehicle using the provided gasket.
41. Install the four HCU stud nuts and tighten to 21 ft-lbs (28 N·m).
42. Coat the surface of the brake pedal pin with lubriplate or equivalent.

Service Procedure (Continued)

43. Connect the push rod to the pedal pin and install the provided retainer clip. Make sure that the brake light switch is properly adjusted.

IMPORTANT: The HCU push rod must be assembled to the brake pedal pin as shown in Figure 9.



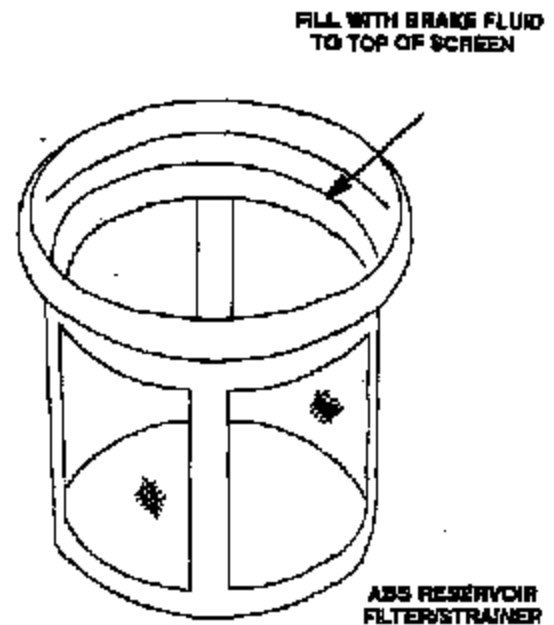
94387-949

Figure 9

44. Reinstall the instrument panel sight shield, if necessary.
45. Install the four brake tubes. Tighten the fittings to 145 in-lbs (16 N·m) for AC/AY/BB vehicles or to 155 in-lbs (17 N·m) for AS vehicles.
46. For AS body vehicles, reconnect the TPS electrical connector.
47. Install the windshield washer fluid bottle, if necessary.
48. **IF THE PUMP/MOTOR ASSEMBLY MUST ALSO BE REPLACED, skip to Section C, Step 9.**
49. Install the pump/motor supply (low pressure) hose and tighten the clamp to 10 in-lbs (1 N·m).
50. Install the pump/motor high pressure hose and tighten to 145 in-lbs (16 N·m).

Service Procedure (Continued)

51. Connect the two 10-way HCU electrical connectors.
52. Fill the HCU brake fluid reservoir to the top of the screen on the reservoir filter/strainer with clean brake fluid conforming to DOT 3 specifications (Figure 10).
53. If the pump/motor assembly does not require replacement, continue with Section D.



94387-860

Figure 10

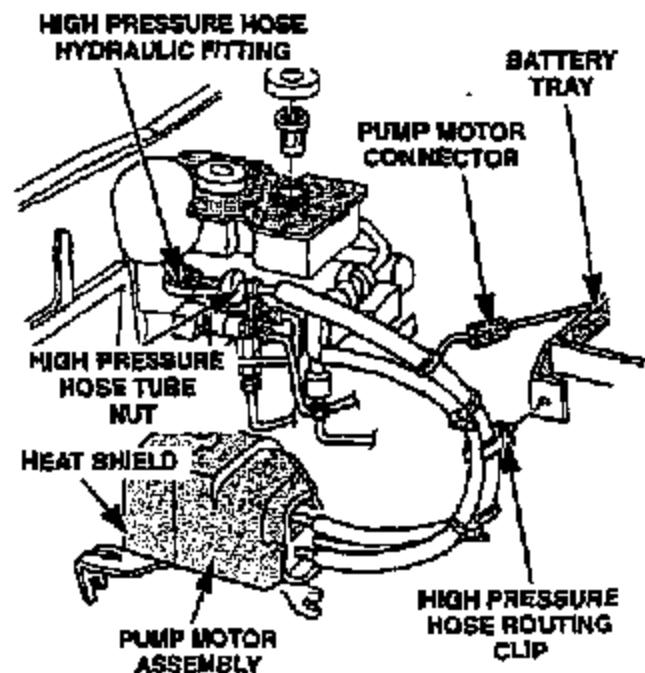
Service Procedure (Continued)

C. Replace Pump/Motor Assembly:

1. With the ignition key in the OFF position, open the test fixture valve and then pump the brake pedal a minimum of 40 times. A noticeable change in the pedal feel will occur when the accumulators are discharged.

WARNING: Brake system is under extreme pressure. The hydraulic control unit (HCU) may be charged with hydraulic pressure up to 2200 psi. Failure to de-pressurize the accumulators could result in personal injury and/or damage to painted surfaces. Wear safety goggles when disconnecting system fluid lines.

2. When a definite increase in pedal pressure is felt, pump the pedal a few additional times to ensure removal of all hydraulic pressure from the brake system.
3. Disconnect any routing clips which attach the high and/or low pressure fluid lines to the body or vehicle components.
4. Disconnect the low pressure hose (Figure 11) at the HCU.
5. Disconnect the high pressure hose assembly from the test fixture.
6. Disconnect the 10-way wiring connector from the test fixture and reconnect it to the HCU.
7. Remove the test fixture (Special Tool #6897).
8. Cap all openings on the reservoir and HCU to prevent brake fluid from leaking.
9. Disconnect all electrical connectors (including pump/motor) that run across the engine compartment in the area around the pump/motor assembly high and low pressure hoses.



94387-847

Figure 11

Service Procedure (Continued)

10. Remove the pump/motor assembly front heat shield to mounting bracket bolt. Remove the heat shield from the pump/motor assembly (Figure 12).
11. Lift pump/motor assembly from mounting bracket and remove from vehicle.
12. Remove high and low pressure hoses from pump/motor assembly.

13. Lubricate the high and low pressure hose O-rings with clean brake fluid and position on new pump/motor assembly. Tighten banjo bolt to 124 in-lbs (14 N•m).

14. Position new pump/motor assembly in mounting bracket.

15. Position heat shield over pump/motor on mounting bracket and install attaching bolt.

16. Remove caps from reservoir and HCU openings.

17. Attach high pressure hose to HCU and tighten fitting to 145 in-lbs (16 N•m).

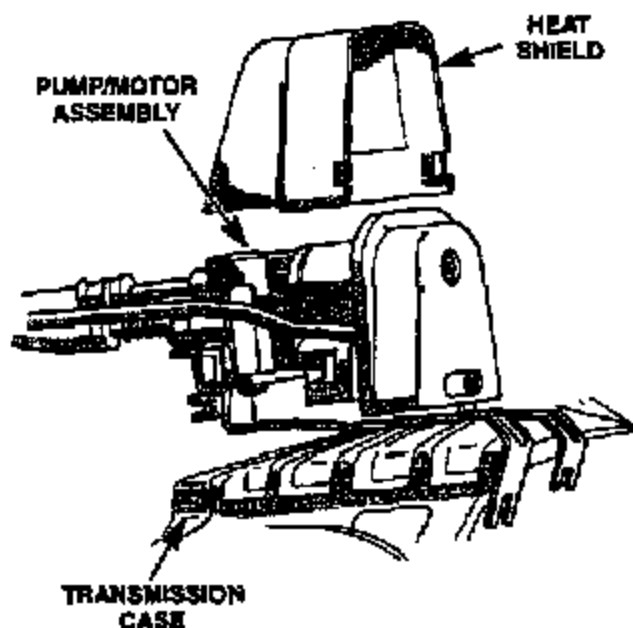
18. Connect low pressure hose to HCU and tighten clamp to 10 in-lbs (1 N•m).

19. Connect pump/motor assembly wiring harness to underhood wiring harness.

20. Reconnect all underhood wiring connectors.

21. Reconnect all routing clips that secure the high and/or low pressure hoses to the body or other components.

22. Proceed to Section D.



94967-846

Figure 12

Service Procedure (Continued)

D. Bleed Brakes and Verify Proper System Operation:

1. IF THE PRIMARY PISTON ASSEMBLY WAS REPLACED, the brake lines must be bled using either pressure bleeding or manual bleeding as described on pages 338-339 of the Bendix Antilock 9 & 10 Service and Diagnostic Procedures Manual (81-699-96086).

NOTE: It is not necessary to bleed the foundation brakes of the vehicle if only the pump/motor assembly has been replaced.

2. Turn the ignition to the RUN position to energize the pump/motor and pressurize the hydraulic system. Check for leakage at the HCU and/or pump/motor.
3. With the ignition key in the OFF position, pump the brake pedal a minimum of 40 times. A noticeable change in the pedal feel will occur when the accumulators are discharged.

WARNING: Brake system is under extreme pressure. The hydraulic control unit (HCU) may be charged with hydraulic pressure up to 2200 psi. Failure to de-pressurize the accumulators could result in personal injury and/or damage to painted surfaces. Wear safety goggles when disconnecting system fluid lines.

4. Check the brake fluid level in the HCU reservoir and adjust as necessary.
5. Reinstall the air cleaner assembly.
6. With the ignition key in the ON position, monitor the DTC display for four minutes.
 - If any DTC's are displayed, they must be diagnosed and repaired in the order that they are listed on page 221 of the Bendix Antilock 9 & 10 Service and Diagnostic Procedures Manual (81-699-96086).
 - If no DTC's are displayed, continue with Step 7.
7. Using the DRB Scan tool, verify that the stop lamp input reads "ON" when the brake pedal is depressed.
8. Using the DRB scan tool, monitor the accumulator voltage. Depress the brake pedal 40 times. The accumulator voltage should exceed 4.0 volts temporarily just before the pump begins to run.

Service Procedure (Continued)

9. With the brake pedal released, make sure that the boost and primary pressure transducers voltages are both between 0.1 volts and 4.0 volts.
10. Road test the vehicle for a minimum of 5 minutes at various speeds while performing several antilock braking and normal braking stops.
11. With the ignition key in the ON position, check for DTC's.
 - If any DTC's are displayed, they must be diagnosed and repaired in the order that they are listed on page 221 of the Bendix Antilock 9 & 10 Service and Diagnostic Procedures Manual (81-699-96088).

Completion Reporting and Reimbursement

Claims for vehicles which have been serviced must be submitted on the DIAL System. Claims submitted will be used by Chrysler to record recall service completions and provide dealer payments.

Use one of the following labor operation numbers and time allowances:

	Labor Operation Number	Time Allowance
Inspect ABS for proper operation	05685181	0.8 hours
Inspect ABS and replace actuator piston assemblies	05685182	3.2 hours
Inspect ABS and replace pump/motor assembly	05685183	1.8 hours
Inspect ABS and replace actuator piston and pump/motor assemblies	05685184	3.8 hours

Add the cost of the recall parts package(s) plus applicable dealer allowance to your claim.

NOTE: Any other ABS repairs must be performed according to the Bendix Antilock 9 & 10 Service and Diagnostic Procedures Manual and/or applicable Technical Service Bulletins and a separate claim must be filed for reimbursement.

Parts Return

Removed actuator piston assemblies and pump/motor assemblies must be returned to the Warranty Material Return Center. **Timely parts return is critical in assuring an adequate supply of future repair parts.** Dealers will be charged back for parts which are not promptly returned.

Note: See Warranty Administration Manual, Recall Claim Processing Section for complete recall claim processing and material return instructions.

Vehicle Not Available

If a vehicle is not available for service for a known reason, let us know by filling out the pre-addressed Vehicle Disposition Form portion of the Owner Notification Form or describe the reason on a postcard and mail to:

Chrysler Corporation
CIMS 482-00-85
800 Chrysler Drive East
Auburn Hills, Michigan 48326-2757

Following the above procedures will expedite the processing of your claim.

If you have any questions or need assistance in completing this action, please contact your Zone Service Office.

Customer Services Field Operations
Chrysler Corporation

No. 685

September, 1996

SUPPLEMENT

- To:** All Dodge, Chrysler/Plymouth and Jeep & Eagle Dealers
Zone Managers
- Subject:** Safety Recall #685 -- ABS Actuator Piston and Pump/Motor
Assemblies
SUPPLEMENT: STAGE 2 OWNER MAILING
- Models:** Vehicles Listed Below Equipped With a Bendix-10 Antilock Brake
System:
- 1991 Through 1993 Model Year Dodge Caravan/Grand Caravan;
Plymouth Voyager/Grand Voyager; and Chrysler Town & Country
(AS)

Notification to owners of the above model vehicles involved in Stage 2 of this recall will begin in a few days.

Each dealer to whom involved Stage 2 vehicles were invoiced (or the current dealer at the same street address) will receive a list of those vehicles with this letter.

Due to the small number of vehicles expected to require repair, no parts will be distributed initially to dealers. Dealers are requested to order Actuator Piston Assembly packages through normal methods only for scheduled repairs. Dealers must contact the STAR Center (1-800-850-STAR Ext. 5) to order Pump/Motor Assemblies. The technician must perform the ABS diagnostic tests prior to contacting the STAR Center and have the results available for review.

Refer to the Service Procedure section of the August, 1996 dealer notification for service of vehicles involved in this stage of the recall.

Customer Services Field Operations
Chrysler Corporation
685

SAFETY RECALL TO TEST AND REPAIR YOUR VEHICLE'S ANTILOCK BRAKE SYSTEM

Dear Chrysler Vehicle Owner:

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

Chrysler Corporation has determined that a problem which relates to motor vehicle safety exists in some 1991 through 1993 Dodge Caravan/Grand Caravan, Plymouth Voyager/Grand Voyager and Chrysler Town and Country; late-1990 through 1993 Dodge Dynasty, Chrysler New Yorker, Salon, Fifth Avenue and Imperial; and 1991 and 1992 Dodge Monaco and Eagle Premier vehicles equipped with an antilock brake system (ABS).

The problem is... The ABS hydraulic control unit on your vehicle (identified on the enclosed form), may experience excessive brake actuator piston seal wear and/or pump-motor deterioration. If this occurs, the ABS function may be lost and reduced power assist may be experienced during braking. This may result in increased stopping distance that could result in an accident.

**What you
should do...**

Owners of vehicles that experience any of the following symptoms should contact their dealers *immediately* to schedule a service appointment:

- Either the Brake System Warning Light or the Antilock Warning Light remains *illuminated more than two minutes* after starting the vehicle; *or if either light comes on* at any other time during vehicle operation;
- A *substantial* increase in *brake* pedal force is needed to stop the vehicle; *or*
- Any other ABS malfunction occurs.

Please bring the enclosed Owner Notification Form with you to your dealer. It explains the required service to the dealer.

If your ABS brake system is operating properly and none of the above symptoms are present, no action is necessary at this time. However, if any of these symptoms appear in the future, contact your dealer for a free repair. *Keep this letter with your vehicle's other owner information in case you notice any of these conditions in the future.*

*Buckle up
for Safety*



***What Chrysler
and your dealer
will do...***

Chrysler will test your vehicle's ABS for excessive piston seal wear and possible pump-motor deterioration. If problems *with these components* are found at any time during the entire life of your vehicle, *Chrysler* will replace these components free of charge. The test will take about one hour to complete. Another one to two hours *may* be required if components must be replaced. However, additional time may be necessary depending on how dealer appointments are scheduled and processed.

***Extended
Warranty...***

In addition to this recall action, the warranty period on other ABS components in your vehicle is being extended to 10 years or 100,000 miles, which ever occurs first. This means that if any of these other ABS components fail within 10 years or 100,000 miles, your dealer will correct the problem free of charge. This extended warranty is limited to the same conditions defined in the original warranty and does not include any base brake system components (calipers, pad/shoe linings, etc.). Further, Chrysler will reimburse owners for any previous ABS component expenses incurred within the limits of the extended warranty. Just send the original receipt to :

Chrysler Corporation - Recall #685 Reimbursement
P.O. Box 21-8004
Auburn Hills, MI 48321-8004

***If you need
help...***

If you have any questions about whether your ABS system is operating properly, contact your dealer.

If you have trouble getting your vehicle repaired, please call the **Chrysler Customer Center, toll free, at 1-800-853-1403**. A representative will assist you in getting your vehicle repaired. If your dealer fails or is unable to remedy this defect without charge and within a reasonable time, you may submit a written complaint to the Administrator, National Highway Traffic Safety Administration, 400 Seventh Street, S.W., Washington, D.C. 20590, or call the Toll Free Auto Safety Hotline at 1-800-424-9393. (Washington, D.C. area residents may call 366-0123.)

We're sorry for any inconvenience, but we are sincerely concerned about your safety. Thanks for your attention to this important matter.

*Customer Services Field Operations
Chrysler Corporation
685*

Dale E Dawkins
 Director
 Vehicle Compliance & Safety Affairs
 September 23, 1998

**Mr. Michael B. Brownlee, Associate Administrator, Safety Assurance
 National Highway Traffic Safety Administration
 400 Seventh Street, S.W.
 Washington, D.C. 20590**

RECEIVED
 98 SEP 26 AM 10:22
 OFFICE
 DEFECTS INVESTIGATION

Dear Mr. Brownlee:

Reference: NHTSA Identification Number 96V-099

Enclosed are representative copies of additional communications relating to the referenced recall. In order to facilitate implementation, this recall was divided into two phases based on vehicle model. Owner notification for the second phase of the recall will begin in about one week. The number of manufactured vehicles in this phase of the recall is 253,134.

The involved Vehicle Identification Number range for this phase of the recall is:

<u>Model Year</u>	<u>Low</u>	<u>High</u>
1991	MR100002	MR333698
	MX500680	MX688942
1992	NR500003	NR787751
	NX100002	NX341454
1993	PR100011	PR399893
	PX500008	PX779102

(VIN last eight characters) - M = 1991 Model Year; N = 1992 Model Year; P = 1993 Model Year; R = Windsor Assembly Plant, Windsor, Ontario; X = St. Louis Assembly Plant, St. Louis, Missouri; and last six digits = sequential number.

We caution that the above range represents only the lowest and highest VIN sequential numbers included in this part of the recall. This range cannot be used to determine conclusively that a vehicle is involved in the recall because many vehicles with a VIN within the range are not affected by the recall.

This completes Chrysler's package of information for this recall as required by the Defects Report Regulation.

Sincerely,



for Dale E. Dawkins

Enclosure: Safety Recall #685 – ABS Actuator Piston and Pump/Motor Supplement: Stage 2 Owner Mailing

cc: **K. C. DeMeter**
 Chrysler Corporation CIMS 482-0061
 800 Chrysler Drive
 Auburn Hills MI 48326-2737
 B:0 576 7301 FAX B10 576 7321

ODI RESUME

INVESTIGATION: EA95-016 DATE OPENED: 5/26/95 DATE CLOSED: 6/24/96

SUBJECT: Antilock Braking System Malfunction

PROMPTED BY: Consumer complaints and EA94-028

PRINCIPAL ENGINEER: Scott Shadle

MANUFACTURER: Chrysler Corporation

MODELS: Chrysler Fifth Avenue, Imperial and New Yorker, Dodge Dynasty and Monaco, and Eagle Premier equipped with Bendix Antilock 10 braking system

MODEL YEARS: 1990-1993

VEHICLE POPULATION: 67,000

SYNOPSIS: Complaints regarding the braking performance of the subject vehicles equipped with Bendix Antilock 10 braking system included reports of excessively long stopping distances, and in some instances complete loss of braking ability. Some alleged malfunctions occurred intermittently, and some were accompanied by illumination of the ABS warning light. Most failures resulted from excess wear of the seals in the brake power-assist portion of the hydraulic assembly of the ABS system that leads to deterioration of the high pressure hydraulic pump/motor assembly. Leakage of these seals and/or degraded performance of the pump/motor assembly can lead to loss of power assist and loss of ABS function.

FAILURE REPORT SUMMARY

SOURCE:	ODI	Chrysler	TOTAL
REPORTS:	113	1047	1160
ACCIDENTS:	4	5	9
INJURIES:	2	1	3
FATALITIES:	0	0	0

ACTION: This investigation is closed. An April 19, 1996 letter submitted Chrysler's safety defect report (96V-099), recalling all subject vehicles for inspection, testing, and, if necessary, repair.

DEFECT
ENGINEER

DIVISION
CHIEF

OFFICE
DIRECTOR

6/24/96
DATE

6/29/96
DATE

6/24/96
DATE

SUMMARY: The subject vehicles are equipped with an optional (standard on the Imperial) four wheel ABS system, Bendix Antilock 10. The electric pump which pressurizes brake fluid to operate the computer controlled ABS system

also provides the hydraulic pressure that operates the brake power-assist system. Different hydraulic units, control units, and proportioning valves are used, depending on whether the vehicle has a four wheel or two wheel drive train, and if it has a short or long wheelbase.

The 1991 models were recalled to replace the ABS high pressure hose because the crimped fitting may blow off and leak (91V-191). This recall, as well as most of the service bulletins pertaining to the Bendix Antilock 10 systems used on the Chrysler mini-vans (subject of EA94-028), also apply to the subject passenger cars.

The consumer complaints describe various symptoms. Some complaints state that the brake pedal became hard, whereas others state that the pedal was soft and could be fully depressed. Many of the reports state that the brakes failed completely or partially on several occasions, but then functioned normally again, and the dealer could not find a problem. Replacement of ABS system components, such as the pump or the hydraulic unit assembly failed to prevent recurrences in some cases.

Information received during the investigation revealed that excessive wear and subsequent leakage past the seals in the hydraulic assembly (like the master cylinder in a conventional braking system) could result in premature deterioration of the pump/motor assembly. This deterioration could result in either total failure of the pump/motor or in its intermittent operation. In either case, the result could be loss of brake power-assist and loss of ABS function. It is also possible that the seals themselves are prone to intermittent gross leakage that would result in similar symptoms. Due to the possible intermittent nature of these failures, it is possible that although ABS and, possibly, brake failure warning lamps would be illuminated during the failure no diagnostic trouble code would be stored by the ABS computer substantially complicating diagnosis and repair of the vehicle. Subsequent to the production of the subject vehicles, Chrysler revised the seals used in the brake actuator piston assembly kits used to repair these vehicles. It is these kits that will be used to repair those vehicles that are found to have degraded seals. On those vehicles whose pump/motor assembly is found to be degraded, that assembly will also be replaced as part of the recall.

Chrysler has not only agreed to recall and repair the subject vehicles, but will also extend the warranty on all components of the Bendix Antilock 10 braking systems to 10 years/100,000 miles, except for the brake actuator piston assembly and the pump/motor assembly which, by the recall, are effectively warranted forever. Chrysler also indicated that they would reimburse owners for prior repair costs related to the failure and degradation of the seals and pump/motor assemblies.

#

ODI RESUME

INVESTIGATION: EA94-028 DATE OPENED: 7/29/94 DATE CLOSED: 6/24/96

SUBJECT: Antilock Braking System Malfunction

PROMPTED BY: PR94-024

PRINCIPAL ENGINEER: Scott Shadle

MANUFACTURER: Chrysler Corporation

MODELS: Chrysler Town & Country, Dodge Caravan and Grand Caravan, and Plymouth Voyager and Grand Voyager

MODEL YEARS: 1991-1993

VEHICLE POPULATION: 254,000

SYNOPSIS: Complaints regarding the braking performance of the subject vehicles equipped with Bendix Antilock 10 braking system included reports of excessively long stopping distances, and in some instances complete loss of braking ability. Some alleged malfunctions occurred intermittently, and some were accompanied by illumination of the ABS warning light. Most failures resulted from excess wear of the seals in the brake power-assist portion of the hydraulic assembly of the ABS system that leads to deterioration of the high pressure hydraulic pump/motor assembly. Leakage of these seals and/or degraded performance of the pump/motor assembly can lead to loss of power assist and loss of ABS function.

FAILURE REPORT SUMMARY

SOURCE:	ODI	Chrysler	TOTAL
REPORTS:	1147	1198	2345
ACCIDENTS:	51	26	77
INJURIES:	27	13	40
FATALITIES:	0	0	0

ACTION: This investigation is closed. An April 19, 1996 letter submitted Chrysler's safety defect report (96V-099), recalling all subject vehicles for inspection, testing, and, if necessary, repair.

DEFECT
ENGINEER

DIVISION
CHIEF

OFFICE
DIRECTOR

6/24/96
DATE

6/24/96
DATE

6/24/96
DATE

SUMMARY: The subject vehicles are equipped with an optional (standard on Town & Country) four wheel ABS system, Bendix Antilock 10. The electric pump which pressurizes brake fluid to operate the computer controlled ABS system also provides the hydraulic pressure that operates the brake power-

2/21

assist system. Different hydraulic units, control units, and proportioning valves are used, depending on whether the vehicle has a four wheel or two wheel drive train, and if it has a short or long wheelbase.

The 1991 models were recalled to replace the ABS high pressure hose because the crimped fitting may blow off and leak (91V-191); and to inspect/replace the ABS pump because it may leak due to possible porosity of the cast metal pump body (92V-030).

The consumer complaints describe various symptoms. Some complaints state that the brake pedal became hard, whereas others state that the pedal was soft and could be fully depressed. Many of the reports state that the brakes failed completely or partially on several occasions, but then functioned normally again, and the dealer could not find a problem. Replacement of ABS system components, such as the pump or the hydraulic unit assembly failed to prevent recurrences in some cases.

Information received during the investigation revealed that excessive wear and subsequent leakage past the seals in the hydraulic assembly (like the master cylinder in a conventional braking system) could result in premature deterioration of the pump/motor assembly. This deterioration could result in either total failure of the pump/motor or in its intermittent operation. In either case, the result could be loss of brake power-assist and loss of ABS function. It is also possible that the seals themselves are prone to intermittent gross leakage that would result in similar symptoms. Due to the possible intermittent nature of these failures, it is possible that although ABS and, possibly, brake failure warning lamps would be illuminated during the failure no diagnostic trouble code would be stored by the ABS computer substantially complicating diagnosis and repair of the vehicle. Subsequent to the production of the subject vehicles, Chrysler revised the seals used in the brake actuator piston assembly kits used to repair these vehicles. It is these kits that will be used to repair those vehicles that are found to have degraded seals. On those vehicles whose pump/motor assembly is found to be degraded, that assembly will also be replaced as part of the recall.

Chrysler has not only agreed to recall and repair the subject vehicles, but will also extend the warranty on all components of the Bendix Antilock 10 braking systems to 10 years/100,000 miles, except for the brake actuator piston assembly and the pump/motor assembly which, by the recall, are effectively warranted forever. Chrysler also indicated that they would reimburse owners for prior repair costs related to the failure and degradation of the seals and pump/motor assemblies.

#

ODI RESUME

INVESTIGATION: PE94-024

DATE UPGRADED: 29-JUL-94

SUBJECT: ABS Braking System Malfunction

[EA 94-020]

PROMPTED BY: Consumer Complaints

PRINCIPAL ENGINEER: Wolfgang Reinhart

Wolfgang Reinhart

MANUFACTURER: Chrysler Corporation

MODELS: Plymouth Voyager and Grand Voyager, Dodge Caravan, Grand Caravan, and Caravan C/V, Chrysler Town And Country.

MODEL YEARS: 1991 Through 1993

VEHICLE POPULATION: 254,185

SYNOPSIS: ABS system malfunctions have reportedly resulted in excessively long stopping distances, and in some instances complete loss of braking ability. Some alleged malfunctions occurred intermittently, and some were accompanied by illumination of the ABS warning light.

FAILURE REPORT SUMMARY

BASIS:	ODI	MANUFACTURER	TOTAL
COMPLAINTS:	262	575	837
ACCIDENTS:	16	10	26
INJ ACCID:	2	1	3
# INJURIES:	2	1	3
# FATALS:	0	0	0

ACTION: Upgrade to an Engineering Analysis.

BRCH CHF.

Richard P. Bell

DIV CHF.

Louis J. Gonyea

OFC DIR.

J. Bunker L. Gathier

July 29, 1994
DATE

7/29/94
DATE

7/29/94
DATE

SUMMARY: The subject vehicles are equipped with an optional (standard on Town & Country) Bendix four wheel ABS system. The electric pump which pressurizes brake fluid to operate the computer controlled ABS system also provides power braking assist. Different hydraulic units, control units, and proportioning valves are used, depending on whether the vehicle has a four wheel or two wheel drive train, and if it has a short or long wheelbase.

The 1991 models were recalled to replace the ABS high pressure hose because the crimped fitting may blow off and leak (91V-191); and to inspect/replace the ABS pump because it may leak due to possible porosity of the cast metal pump body (92V-030).

(Continued)

John 7/29/94

The consumer complaints describe various symptoms. Some complaints state that the brake pedal became hard, whereas others state that the pedal was soft and could be fully depressed. Many of the reports state that the brakes failed completely or partially on several occasions, but then functioned normally again, and the dealer could not find a problem. Replacement of ABS system components, such as the pump or the hydraulic unit assembly failed to prevent recurrences in some cases.

From 2.7 to 4.6 percent of the hydraulic control units, depending on wheelbase and drive train, and approximately 3 percent of the pump and motor assemblies, were replaced under warranty on 1992 models which were not included in any relevant recalls. However, no specific defect has been identified at this time.

Chrysler claims that most complaints involve 1991 models which were recalled, but NHTSA continues to receive consumer complaints each week involving 1991 through 1993 models. This investigation is complicated by the facts that four different versions of the system exist, two recalls have been conducted, and many of the complaints involve allegedly intermittent problems, the cause of which is frequently not found by the servicing dealer. This investigation should be upgraded to an Engineering Analysis to obtain additional information.